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### Research Note

## Presence of *Eustrongylides* sp. (Jägerskiöld, 1909) (Nematoda: Dioctophymatoidea) in *Galaxias maculatus* (Jenyns, 1842) (Pisces: Galaxiidae) from Patagonia, Argentina

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**ABSTRACT:** During a study of the parasitofauna of *Galaxias maculatus* from Patagonia, Argentina, specimens with melanosis on the caudal peduncle were found. The melanosis was caused by encapsulation of an *Eustrongylides* sp. larva. By experimentation using chicks, a subadult with a poorly developed posterior end and a cephalic end similar to *E. tubifex* was obtained. This is the first report of *Eustrongylides* in fishes from Argentina and in *G. maculatus* from South America, including a new location and type of reaction.

**KEY WORDS:** *Eustrongylides* sp., *Galaxias maculatus*, melanosis, Argentina, Patagonia.

*Eustrongylides* sp. (Jägerskiöld, 1909) is a cosmopolitan genus, and its larva has been reported as parasitizing galaxiids from Australia (Johnston and Mawson, 1940) and *Galaxias maculatus* from New Zealand (Hine, 1978) and Australia (Pollard, 1974). Its life cycle includes an aquatic oligochaete, a fish, and a piscivorous bird. In the fish, the larva migrates from the di-

gestive tract to the cavity or musculature of the body wall (Measures, 1988 a, b, c).

Eustrongylidosis can reach epizootic proportions when the environment has been altered by anthropic action, allowing proliferation of aquatic oligochaetes (Spalding et al., 1993); for example, a high mortality of piscivorous birds due to *E. ignotus* has been reported in North America (Spalding and Forrester, 1993). Also, humans can acquire the parasite by eating raw or poorly cooked fish (Lichtenfels and Stroup, 1985).

During a survey of parasites of *G. maculatus* (Jenyns, 1842) in Patagonia, Argentina, monthly samples were taken at different depths (0 to 50 m) from Lake Gutiérrez (41°12'S, 71°26'W). This oligotrophic, nonpolluted lake is of glacial origin, with 112.2 m of maximum depth and water temperatures ranging from 6° to 16°C. A total of 1,669 *G. maculatus* specimens (33.7–61.3-mm length;  $\bar{X}$  = 44.5) were checked between 1994 and 1997.

Macroscopic observation revealed fish with swelling and a strongly melanized capsule at the caudal peduncle (Fig. 1). The capsules are 3.7

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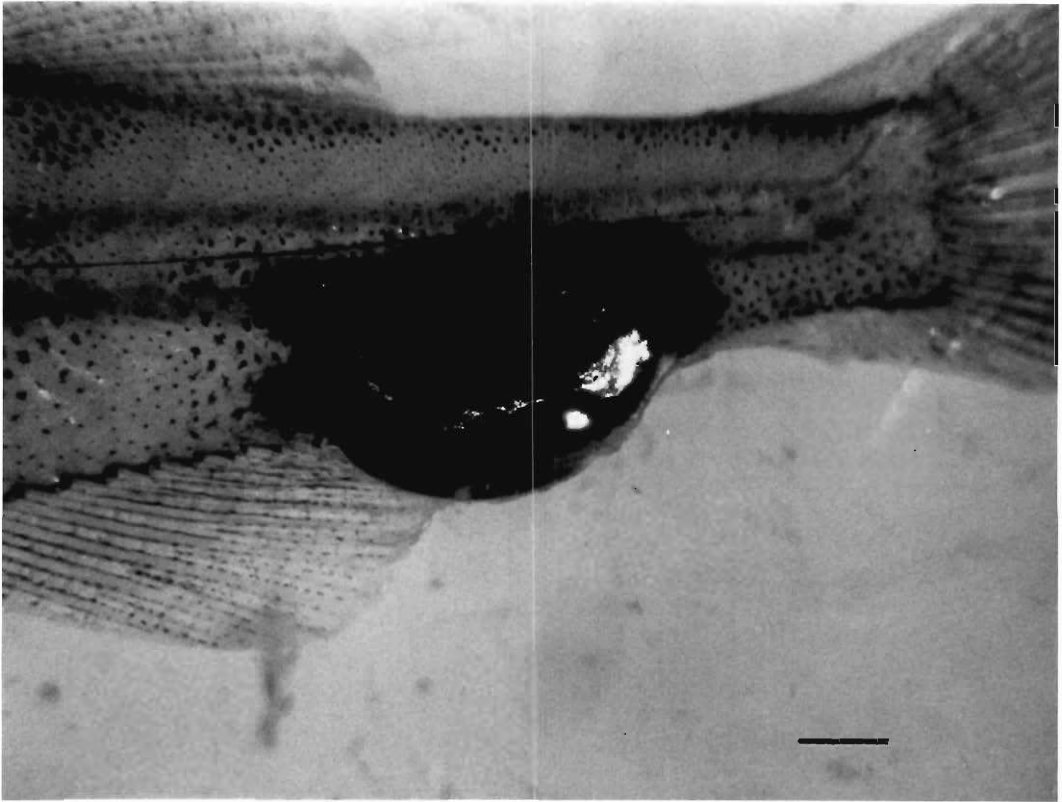


Figure 1. Capsule formed by *Eustrongylides* sp. in *G. maculatus* caudal peduncle. Scale bar = 1 mm.

to 5 mm in length, 1.4 to 3.9 mm in height, nearly oval shaped, black colored, and with smooth and regular surface. Dissection of capsules showed the presence of 1 living nematode larva in each one. The intracapsular liquid is colorless, and the larva is situated between muscle and vertebral column. Third- or fourth-stage larvae obtained were assigned to the genus *Eustrongylides*, as they had a mouth in the form of a dorsoventral slit, 2 rings of 6 labial papillae, terminal genital primordia, and rounded posterior extremity with terminal anus (Lichtenfels and Madden, 1980).

The parasites occurred only during summer months, with temperatures ranging from 10° to 16°C. Infected fish (39–60-mm length) were only captured near the shore. The total prevalence of *Eustrongylides* in *G. maculatus* was 0.78%, with the highest value (8%) recorded in January 1997. Mean intensity was always 1.00.

Of the nematodes obtained, 6 specimens were third-stage larvae and 5 were fourth-stage larvae, according to characterization of Lichtenfels

and Pillit (1986) for larvae of *Eustrongylides* sp. Both third-stage larvae (9–19 mm long) and fourth-stage larvae (16–24 mm long) were smaller than larvae of *E. tubifex* described by Measures (1988c). Morphology of genital primordia allowed identification of the sexes of fourth-stage larvae as 3 males and 2 females.

Three fourth-stage larvae were used for experiments using 3 newly hatched chicks to obtain adults for species determination. A fourth-stage larva was obtained at 22 hr postinfection and a subadult at 18 days postinfection. Both were located in the wall of the proventriculus. One chick died at 6 days postinfection, and no worms were found at necropsy.

The subadult worm (40 mm long) was studied following Measures (1988a). It had an inner circle of 6 labial papillae with spinelike apices and an outer circle of 6 larger cephalic papillae with wide bases and nipplelike apices. Due to the stage of conservation and maturity, the poorly developed caudal end was not of diagnostic value. The morphological features described coin-

cide with the redescription of *E. tubifex* by Measures (1988a). The species can only be definitively assigned after further experimentation, which is difficult to carry out because of the low prevalence and intensity of infections in nature.

The fish host is probably an important item in the diet of piscivorous birds, but only 1 such report about *Phalacrocorax atriceps* has been published and *G. maculatus* is indeed included as an element in its diet (Rasmussen et al., 1992). Infection to man is possible, but to our knowledge, this particular fish is routinely used as food only in Chile.

Although nematode parasites are often encapsulated by the host, the aberrant location in the caudal peduncle and this type of reaction have not been previously recorded in any species of *Eustrongylides* described in fishes. This is the first report of *Eustrongylides* sp. from Argentina and the first in *G. maculatus* from South America.

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